

completion or restoration of a plant body after injury without regard to the manner in which it occurs. Pfeffer (Phys. of Plts. trans. by Ewart, 2: 167. 1903) states that "only those cases ought to be designated as regeneration in higher plants in which the new parts formed after injury or loss exactly resemble in number and position the organs that have been removed." McCallum (Bot. Gaz. 40: 98. 1905) recognizes three forms of regeneration as follows: "(1) The part removed is entirely restored by the growth of cells immediately below the cut surface; (2) there is no growth of embryonic tissue at the wounded surface, but at a greater or less distance from it the organization of entirely new primordia which develop organs which replace those removed; (3) the organ removed is restored by the development of already existing dormant buds." Dr. Kupfer (Mem. Tor. Bot. Club 12: 196. 1907) says "The word regeneration ought to be limited to those cases in which an organ is formed, *de novo*, at a place or under conditions in which it would not normally be formed."

In the broadest sense of the term this form of reproduction in *Drosera* may be termed regeneration, but since it may occur on portions of the plant which are still attached to the main axis, without the apparent stimulus of injury, it seems better to place it in the category of plants that reproduce by budding than as an example of regeneration. However it is an illustration of a principle which much of the work on regeneration teaches, that the different forms of reproduction in plants may be arranged in a scale of slight gradations.

WINIFRED J. ROBINSON

NEW YORK BOTANICAL GARDEN

JUGLANDACEAE FROM THE PLEISTOCENE OF MARYLAND *

BY EDWARD W. BERRY

Some years ago a very complete account of the Pleistocene flora of Maryland was given by Dr. Hollick † who enumerated

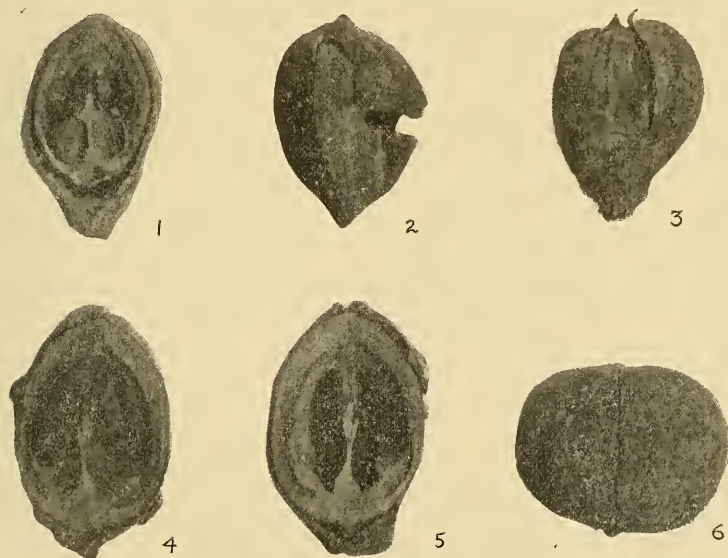
* Illustrated with the aid of the Catherine McManes fund.

† Hollick, Maryland Geol. Surv., Pliocene and Pleistocene, 217-237, pl. 67-75. 1906.

about forty species of plants from deposits of this age in that state. Among these there were five members of the family Juglandaceae represented by leaflets of *Juglans*, *Hicoria*, and possibly *Pterocarya* (although the latter is doubtfully determined), and a small poorly preserved nut of *Hicoria*.

Remains of *Hicoria*, both leaflets and nuts, have proved to be very common in such of our Pleistocene deposits south of the terminal moraine as have been exploited. *Juglans*, on the other hand, has thus far proved to be exceedingly rare.

I am indebted to Dr. F. H. Knowlton, of the U. S. National Museum, for the privilege of describing the present exceptionally well preserved specimens which were collected from the Talbot



formation, about one mile south of Chesapeake Beach in Calvert County by William Palmer.

Hicoria glabra (Mill.) Britton.

Several extremely well preserved specimens of the fruit of this species were collected some of which are shown in figs. 1-5. These bring out very well the pear-shaped outline, the indehiscent husk, and the thick shell which characterize the modern

fruits of this species and from which the fossils are indistinguishable. This species has been found fossil at a number of localities. The writer has recorded it from both Virginia * and North Carolina ; † Mercer reports numerous specimens from the celebrated cave deposits at Port Kennedy, Pa. ; ‡ and the leaflets described by Hollick § from the Maryland Pleistocene as *Hicoria pseudo-glabra* may well belong to the same species. This comparative frequency of occurrence in the Pleistocene would seem to indicate that it was exceedingly abundant. Its presence in these deposits can hardly be attributed to more favorable opportunities for preservation since other hickories like *Hicoria minima* and *Hicoria aquatica* inhabit wetter situations and would seem to be equally well situated for interment in river and estuary swamp deposits.

As previously mentioned, the genus *Hicoria* is abundant in the Pleistocene, additional American records being those of *Hicoria pecan*, || *Hicoria ovata*, ¶ *Hicoria aquatica*, ** and *Hicoria alba*. †† The latter is found in the remarkable Interglacial deposits of the Don Valley near Toronto, Canada, and enables us to form somewhat of an estimate of the time involved in the geological changes of the Quaternary, since with the exception of the occasional carrying and burying of the nuts by squirrels, the normal rate of migration which includes the factors of seed dispersal and rate and time required to grow to bearing age, is comparatively slow in this family.

Juglans nigra Linné.

The single nut of this species which was found is shown in fig. 6. It is identical with the smaller nuts of the modern tree. The husk was entirely rotted away and the surface largely smoothed before entombment, the rugosities of the shell being partially eliminated. It seems probable that the tree which bore

* Berry, *Torrey* 6 : 89. 1906.

† Berry, *Journ. Geology* 15 : 340. 1907.

‡ Mercer, *Journ. Acad. Nat. Sci., Phila.* (11) 11 : 277, 281. 1899.

§ Hollick, *loc. cit.* 221. *pl. 72. f. 1, 16, 17.*

|| Leşq., *Am. Journ. Sci.* 27 : 368. 1859.

¶ Mercer, *loc. cit.* 279. Berry, *Journ. Geology* 15 : 340. 1907.

** Berry, *Torrey* 9 : 71. 1909.

†† Mercer, *loc. cit.* 281. Penhallow, *Trans. Roy. Soc. Can.* 10⁴ : 73. 1904 ; *Amer. Nat.* 41 : 446. 1907.

the present specimen grew at some distance from its final resting place and that after a period of desiccation it was brought down by some temporarily swollen stream to the estuary where it finally became water-logged and deposited.

Remains of *Juglans* are not abundant in the Pleistocene deposits and so far as I know nuts have not heretofore been described from our American Pleistocene. In Europe the *Juglans tephrodes* Unger of the Pliocene persists in the Lower Pleistocene of the Netherlands: *Juglans regia* Linné is recorded from a number of Pleistocene localities in France, Italy, and Germany; and fruits practically identical with the present species and described as *Juglans nigra* var. *fossilis* by Kinkelin* occur in the Upper Pliocene of Germany. Both genera have a long and interesting geological history, the records of *Juglans* antedating those of *Hicoria* by a considerable interval of time, since the first recorded species of the former are found in strata of Mid-Cretaceous age while the latter has not been found as yet until toward the close of the Upper Cretaceous.

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PROCEEDINGS OF THE CLUB

MARCH 9, 1909

The meeting was called to order at the American Museum of Natural History at 8:30 P. M., with Dr. E. B. Southwick in the chair. About fifty persons were present. After the reading and approval of the minutes of the preceding meeting, the resignation of Mr. E. L. Rogers was read and accepted. The Club then listened to a very interesting lecture on "Ferns" by Mr. Ralph C. Benedict. The lecture was illustrated by lantern slides made from photographs taken by the speaker.

The meeting adjourned.

PERCY WILSON,
Secretary

MARCH 31, 1909

The meeting was held at the Museum of the New York Botanical Garden at 3:30 P. M., with Dr. J. H. Barnhart in the chair.

* Kink., Senckenb. Abhandl. 29³: 237. pl. 30. f. 8, 9. 1908.